RESPONSES TO CALIFORNIA DEPARTMENT OF PUBLIC HEALTH COMMENTS,
RSY PAD SOIL DATA PACKAGE TU-98
COMMENTS SUBMITTED JANUARY 6, 2021

Page 1 of 107, Summary: Soil Sample Data: RSY 18 Lift 1 Table, Ra226 and Cs137 Final Analytical Results:

Please provide indication or footnote for those analytical results with qualifier U. Also please explain why these results, with qualifier U, were considered qualified to be included in the Soil Sample Statistics analysis on page 12 and 13 of 107. Additionally, CDPH-EMB recommends extending the count time of these results with qualifier U so the analytical results can meet the MDC or DLC.

Response:

The referenced table is intended to provide a summary of the reported concentrations. Individual sample results (including U-flags where applicable) are provided in the analytical data reports starting on page 58 of the data package.

As defined in the Eurofins-TestAmerica sample report (data package page 68 of 107), the qualifier "U" means the result was not detected at the limit of detection – the sample did not have enough Cs-137 activity to be detected above the DLC. A reported result below the DLC does not disqualify the sample result for use in project decisions and calculations as long as the reported DLC is below the project criteria. The use of "non-detect" results as reported by the laboratory is consistent with MARSSIM and MARLAP.

Sample count times are set by the offsite lab to meet their SOPs and to meet project DLC and QC requirements. It is unclear what is meant by "so the analytical results can meet the MDC or DLC," as the MDC or DLC is a value that is calculated individually and independently for every sample. All DLCs reported for Cs-137 are below the RG, and most are below or slightly above the DLC goal of 0.07 pCi/g listed in the WPA SAP WS #15a. The DLC limit of 0.07 pCi/g for Cs-137 is defined as the minimum DLC that will be achieved for the majority of samples under normal analytical conditions. Extending the count time will not make activity appear in the sample (positive detection) if the radionuclide being analyzed is not present in the sample. Additional count time is an option to increase the sensitivity (i.e., lower the DLC) of the measurement, which is not required for these samples.

Page 1 of 107, Summary: Soil Sample Data: RSY 18 Lift 1 Table, Ra226 and Cs137 Final Analytical Results:

Please provide the relevant data and description on how the Gamma Static Investigation Level was established.

Response:

The instrument-specific 3x3 gamma static ILs listed on page 1 of the data package were determined in accordance with Work Plan Section 3.3.1 by taking 20 static measurements in the Navy-approved RBA, and using the mean and standard

deviation of that dataset, where the IL equals the mean plus 3 standard deviations. The RBA 3x3 static data is provided with these responses and will also be submitted as part of the RACR.

Page 2 of 107, Summary: RSY 18 Lift 1 Table, Item 1, Paragraph 2:

"Gamma scan data summary statistics, normal Q-Q plots, histograms, and box plots are provided on pages 3-6." Please confirm if the scan data obtained from soil from RSY 18 Lift 1 is compared to the scan data obtained from reference area for determining the locations of follow up static measurement on RSY 18 Lift 1. However, during the meeting for Parcel G Investigation Levels on 12/3/2020, Navy informed CDPH that the locations of static follow up measurements is determined by evaluating the soil scan data against data obtained in the same lift.

Response:

Gamma scanning of the RSY pads is conducted with the RS-700. Analysis of the RS-700 gamma scanning data is completed in accordance with Work Plan Section 3.5.1.1. This section describes the use of RSY dataset-specific Z-scores to inform the decision of where follow-up measurements are needed. As stated on the December 3, 2020 call, and in accordance with Work Plan Section 3.5.1.1, the RSY RS-700 gamma scan data are not evaluated against RBA data for determining where to take follow-up measurements.

Page 3 to 6 of 107 and Page 14 to 57 of 107, Statistical Summary Reference Background Table and Net Gamma Spectrum:

Please provide justification for the selection of the Reference Background Area (RBA) near Bldg. 809 for collection gamma static and scan data for the Parcel G rework. Also provide details of the methodology used to obtain reference area scan and static data, a statistical summary of scan reference data, and the Gamma spectrums of all static reference measurements.

Response:

Due to the extremely limited availability of non-impacted, open soil areas within HPNS, reasonable effort was made to select a soil RBA that is suitable for Parcel G. The area selected near Building 809 is not deemed 'impacted' by the HRA, and no unusual anomalies were detected during the gamma scan of the area. It should be noted that the count rates measured with the RS-700 in this RBA are comparable to measurements from previous years from the previous soil RBA near Building 810 (as shown on the map).

WPA Section 3.2 states that the same survey method and equipment shall be used to collect RBA data as RSY pad data. This refers to the survey process: scan speed, detector configuration, etc. RBA soil is not excavated onto an RSY pad for scanning

as this would destroy the RBA for future use by APTIM, other contractors, or regulators. All other aspects of the survey process for the RBA are the same as for surveys performed on RSY pads.

Statistical summary of RS-700 scan reference area data is provided in pages 3-6 of every RSY data report. These are provided in accordance with Work Plan Section 5.2.2. The static reference measurements will be included in the RACR.

Page 7 to 8 of 107, RSI Data Plots:

Please provide the RSI data plots for all the Z scores and count rate ratios that were utilized in determining the follow up locations. According to Final Parcel G Work Plan Section 3.5.1.1, three Z scores (Z scores, local Z-scores, and semi-local Z-scores) of five Region of Interests (ROIs) from three virtual detectors (VDs) of each location, three types of Z scores in time series, and the count rate ratios for key ROIs were used in the determination of follow up location.

Response:

RS-700 data are processed using a Python code that evaluates the relevant ROIs in accordance with the z-score process outlined in Work Plan Section 3.5.1.1. As the program identifies outliers and followup locations associated with standard Z-scores, local Z-scores, and semi-local Z-scores, additional visual review of plots is not performed, and plots are generated only to display the scan data. The standard z-score data from VD1 (consisting of both detectors), shown on the RSI data plots on pages 7 and 8 of the data package, provide the most straightforward depiction of the RSY scan data.

Page 14 to 57 of 107, Net Gamma Spectrum:

Please explain the criteria in determining if biased samples should be obtained from those follow-up locations.

Response:

As stated in Work Plan Section 3.3.1 and referenced on page 2 of the RSY data package, "the net spectrum will be plotted and the critical levels assessed for ROC-specific energy ranges to find out if there is any activity present above background. Critical levels, as defined in the MARSSIM Section 6.7.1, represent thresholds above which net counts are statistically greater than background. If the gamma spectroscopy detector system static measurements identify elevated locations, biased samples will be collected". If the net count rates in the project ROC-specific ROIs (which are shown in the net spectra provided in the RSY data package) exceed the critical level, a biased sample will be collected. Critical levels were provided to the agencies, and are plotted on the spectra. Please note that if the maximum

extent of the y-axis of the spectrum is lower than the critical level for a given ROI, the critical level will not appear on the spectrum.

Page 14 to 57 of 107, Net Gamma Spectrum:

Please provide the complete gamma spectrum obtained from those follow-up locations, instead of the net gamma spectrum. According to Final Parcel G Work Plan Section 3.3.1, page 3-5, 1st paragraph"*..., the static count spectra will be provided in the data reports."*

Response:

Sentences preceding the one quoted by CDPH in Work Plan Section 3.3.1 state the following: "For gamma scan investigations, the ***net*** spectrum will be plotted and the critical levels assessed for ROC-specific energy ranges to find out if there is any activity present above background." The net spectra are plotted because net data are used with critical levels.

Page 65, Chain of Custody:

Please provide the purpose of collecting soil samples HPPG-F-005 and HPPG-F-006.

Response:

These samples are field duplicates, as required by SAP WS#12. The Data Quality Assessment which will be included in the RACR will provide an analysis and discussion of all field duplicates for this project.

Page 71 to 107 of 107, Sample Results:

Please provide the explanation on how the Ra-226 concentration was determined by the counts recorded in ROI 3, ROI 6, and ROI 8 listed in Region of Interests (ROI) Summary Table on Page 2 of 107. Specifically, what are the primary, secondary, or tertiary ROI utilized to determine the Ra-226 concentration?

Response:

The pages referenced in the comment are part of the Eurofins-TestAmerica laboratory data reports as shown by their cover pages on pages 58 and 93 of the data package. Eurofins-TestAmerica is the offsite laboratory (located in Missouri) the soil samples are sent to for analysis. Work Plan Section 3.7 states that samples are submitted to an accredited offsite laboratory for analysis. In accordance with the SAP WS# 15a, Ra-226 concentrations are determined in soil via gamma spectroscopy by the offsite laboratory using the 609 keV gamma emission from Bi-214 following a 21-day ingrowth. The listed ROIs associated with the RS-700 are not used to quantify Ra-226 concentrations.

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3x3 NaI Soil RBA Static Data

3x3 S/N #117648	
Measurement #	Reading (cpm)
1	12665
2	11832
3	9428
4	10782
5	9192
6	8171
7	9471
8	9435
9	9672
10	10667
11	8036
12	8893
13	7338
14	8295
15	8932
16	11501
17	10771
18	10369
19	12557
20	11773
Mean (cpm)	9989
Std Dev (cpm)	1546
IL (cpm)	14627

3x3 S/N #108853	
Measurement #	Reading (cpm)
1	13270
2	12940
3	13282
4	15063
5	13237
6	11486
7	13027
8	13343
9	12909
10	14196
11	12488
12	14119
13	11541
14	12731
15	13219
16	12158
17	13916
18	12769
19	13534
20	12749
Mean (cpm)	13099
Std Dev (cpm)	853
IL (cpm)	15658

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3x3 NaI Soil RBA Static Data

3x3 S/N #271420	
Measurement #	Reading (cpm)
1	12702
2	12533
3	12962
4	14802
5	13086
6	11507
7	12474
8	13083
9	12489
10	13933
11	12200
12	13631
13	10886
14	12382
15	12649
16	11733
17	13782
18	12798
19	12648
20	12353
Mean (cpm)	12731
Std Dev (cpm)	876
IL (cpm)	15359

3x3 S/N #117652	
Measurement #	Reading (cpm)
1	14011
2	13616
3	13977
4	15621
5	13996
6	12188
7	14152
8	14365
9	13601
10	14904
11	13281
12	14855
13	12359
14	13784
15	13225
16	12929
17	15175
18	13800
19	15256
20	13247
Mean (cpm)	13917
Std Dev (cpm)	928
IL (cpm)	16700